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**(54) METHOD AND APPARATUS FOR MEASURING TIME WAVEFORM OF LIGHT SIGNAL FIELD**

(57) Abstract:

**PROBLEM TO BE SOLVED:** To substantially eliminate a sensitivity decrease and enable correct measurements without repeated operations by letting a light having a phase fixed act to a light to be measured, generating a phase conjugate light, observing a mixed spectrum of the synthesized light to be measured and phase conjugate light, and obtaining a spectral phase.

**SOLUTION:** One of a light signal 101 to be measured which enters a branching mirror 102 and is branched by the mirror enters a secondary nonlinear medium 105 and focused through a wave filter 103 and an optical amplifier 104. A second harmonic (pump light) is generated at

the nonlinear medium 105. The generated pump light reaches a synthesis mirror 111 through a wave filter 106, an optical amplifier 107 and a reflecting mirror 108. The other of the light signal 101 to be measured reaches the synthesis mirror 111 through reflecting mirrors 109 and 110. The pump light and light signal are synthesized, which enters a next nonlinear medium 113 through a phase adjustment device 112 and is focused. Parametric mixing is generated in the nonlinear medium 113. A power spectrum of a projected light is observed by an optical spectrum observation device 115.

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